

## February 2015 Regional Climate Summary

### For the San Francisco Bay Area and Monterey Bay Area

**February 2015 was a record warm month, contributing to a record warm winter.** February 2015 was also quite dry, with only one significant rain event.

After an exceptionally dry January, February got off to a promising start when an “atmospheric river” developed across the Eastern Pacific. By February 3 a plume of very moist air (atmospheric river) extended from near the Hawaiian Islands northeast towards the west coast. Weather prediction models indicated that this atmospheric river would deliver heavy amounts of precipitation to the San Francisco Bay Area from Friday, February 6 through Sunday, February 8. Flash flood watches were issued for the North Bay counties. The airmass ahead of this developing atmospheric river was unseasonably warm. A few daily high temperature records were set from the 2<sup>nd</sup> through the 4<sup>th</sup>, including a high of 81 at King City on Wednesday, February 4.

Rain began to spread into the North Bay by 10 pm on the evening of Thursday, February 5. Southerly winds increased overnight and became strong and gusty along the coast and in the hills by the predawn hours of Friday, February 6. Scattered power outages were reported by mid-morning and a lightning strike was detected offshore just west of San Francisco at 9:30 am. Rain was heaviest in the North Bay during the overnight hours. Significant rain and gusty winds then spread south across the remainder of the San Francisco Bay Area on Friday, and rain became heavy in the Santa Cruz Mountains late that day. By 6 pm that evening, rain rates of up to 0.75 inches/hour were being observed in the Santa Cruz Mountains. Strong and gusty south winds continued through the evening and into the overnight hours of the 6<sup>th</sup>.

Some peak wind gusts from Friday, February 6, included:

Location	County	Elev. (ft)	Peak Gust (mph)	Time
Los Gatos RAWS	Santa Clara	1841	67	10:32 pm
Big Rock RAWS	Marin	1500	66	1:33 pm
Las Trampas RAWS	Contra Costa	1759	65	2:28 pm
Atlas Peak	Napa	1934	64	10:29 pm
Calaveras Road RAWS	Alameda	1230	59	11:18 am
San Francisco Airport	San Mateo	8	54	6:20 pm
Sonoma County Airport	Sonoma	125	52	9:51 pm
Richmond District	San Francisco	200	46	2:02 pm
Salinas Airport	Monterey	74	44	2:50 pm
San Jose Airport	Santa Clara	51	41	2:54 pm
Oakland Airport	Alameda	86	40	8:10 am



***A large redwood tree toppled on the night of February 6 in the Sonoma county town of Guerneville. Two homes were damaged, but no one was injured. Photo: KRON 4 News***

Rainfall totals through Friday night varied considerably across the region, with the coastal mountains picking up significantly more precipitation compared to lower elevation locations. More than ten inches of rain fell at Venado in northwest Sonoma County from late on the 5<sup>th</sup> through late on the 6<sup>th</sup>. Localized amounts of more than 6 inches were reported in the Santa Cruz and Santa Lucia Mountain ranges. In contrast, locations near sea level from Monterey south received only a quarter of an inch of rain, or less. Rainfall totals for other locations near sea level included:

Santa Rosa Airport: 2.62"

San Rafael: 2.00"

Concord Airport: 1.38"

San Jose Airport: 1.26"

Napa Airport: 1.17"

Oakland Museum: 1.01"

San Francisco Downtown: 0.75"

Santa Cruz: 0.75"



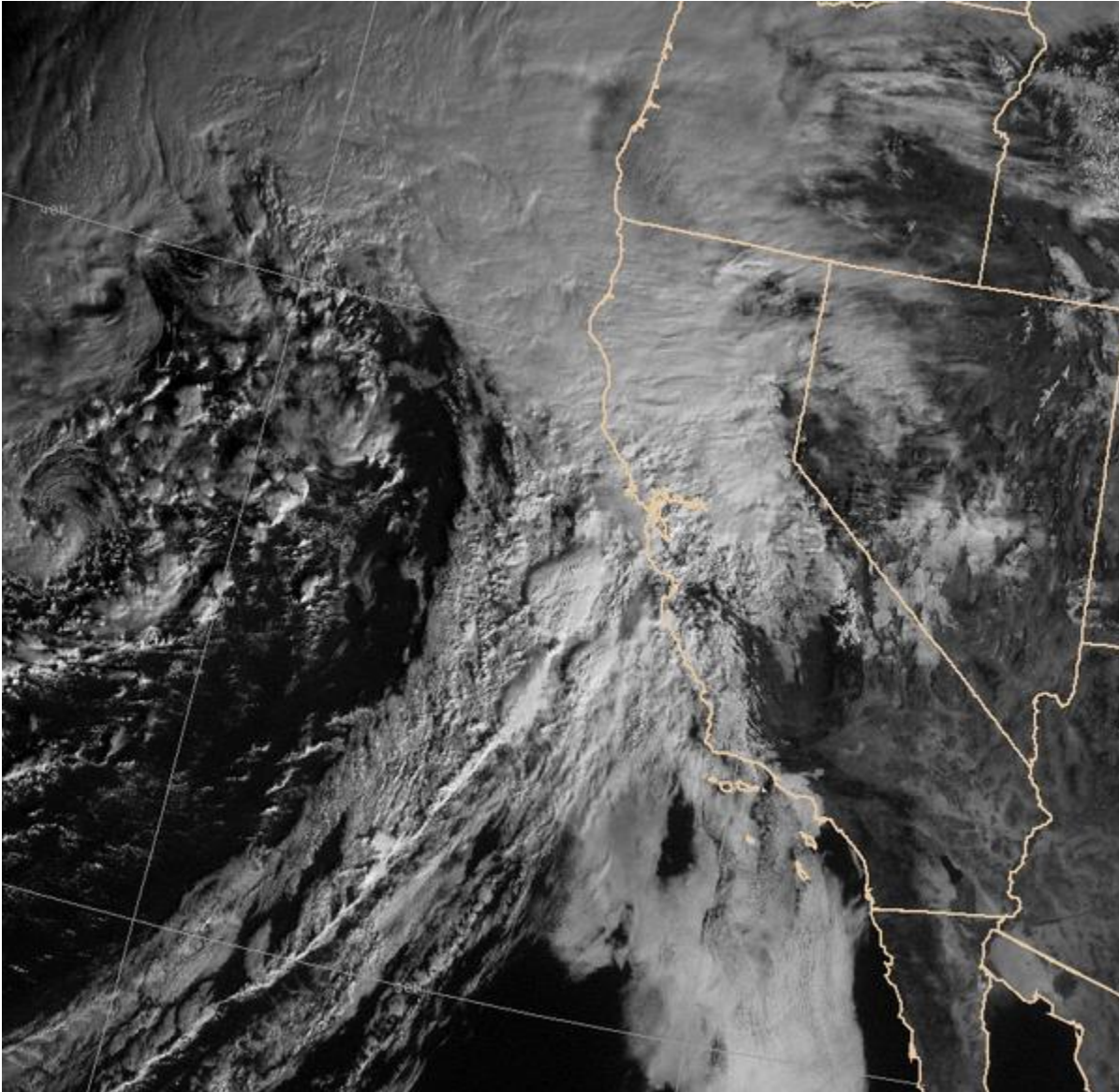
24 Hour Synoptic Precipitation (Inches) Ending Sat Feb 07 2015 at 12 UTC  
NOAA / NWS / California Nevada River Forecast Center

### **24 hour rainfall totals ending at 4 am Saturday, February 7**

There were several reports of wind damage and roadway flooding across the San Francisco Bay Area on February 6. Many of the down trees and tree limbs blocked or partially blocked roadways. Flooding was mostly confined to low lying urban areas and no significant river flooding occurred with this storm.



There was a period of relatively dry weather on Saturday, February 7, before another frontal system approached the coast around sunrise on Sunday, February 8, producing a second round of precipitation.



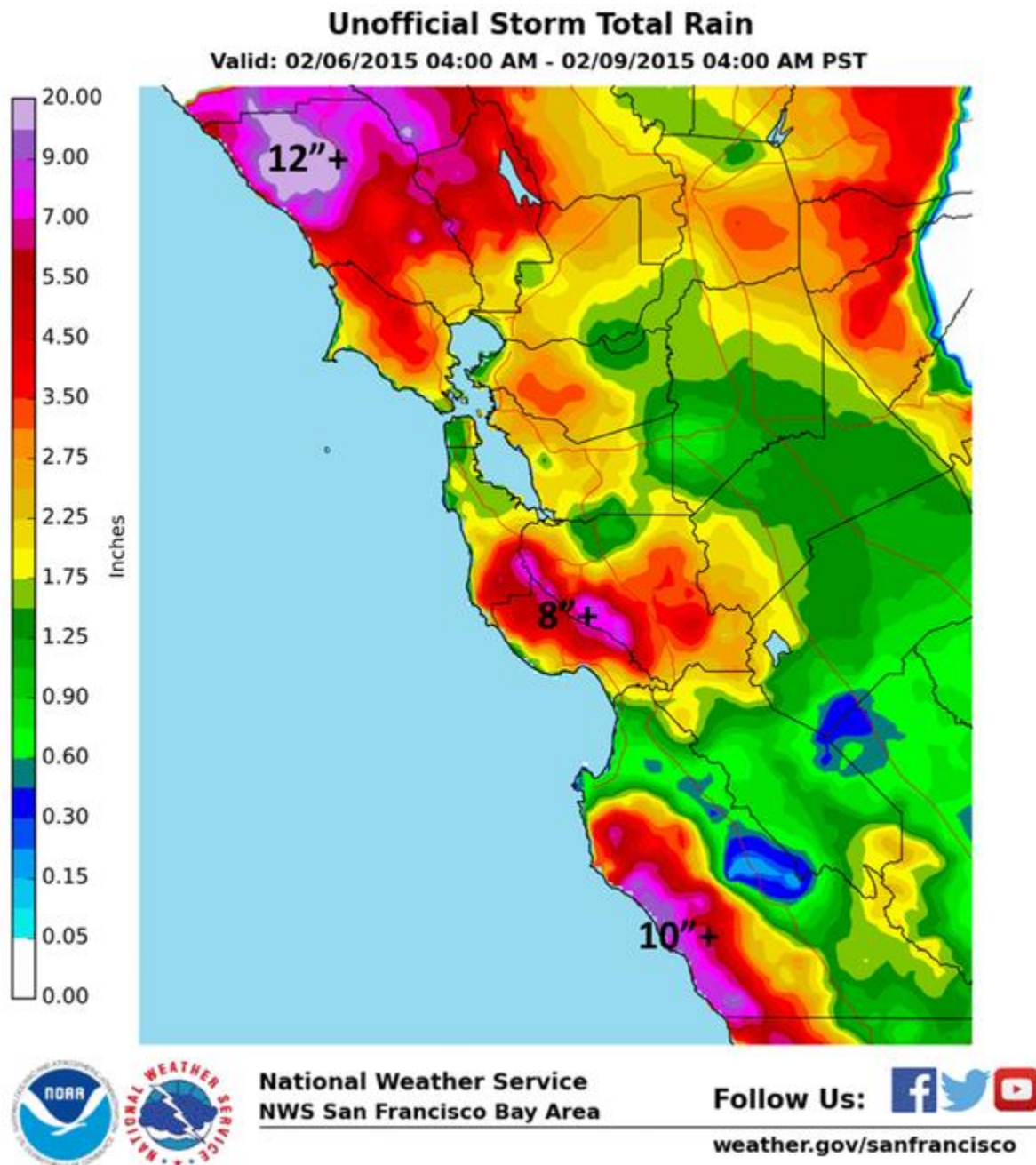
***Visible satellite image from 9:30 am on the morning of Sunday, February 8, 2015***

The airmass with this second impulse on the 8th was somewhat unstable. An isolated thunderstorm developed in the Santa Cruz Mountains around midday, and thunder was heard in the East Bay near Walnut Creek that afternoon.

Another round of strong and gusty winds occurred with this second system on February 8, especially late that evening. Here are some of the higher wind gusts:

Location	County	Elev. (ft)	Peak Gust (mph)	Time
Altamont RAWS	Alameda	1436	69	11:12 pm
Hawkeye RAWS	Sonoma	2024	59	9:56 pm
Los Vaqueros RAWS	Contra Costa	1100	59	11:45 pm
San Francisco Airport	San Mateo	8	55	9:34 pm
Angel Island	Marin	8	54	9:20 pm
Watsonville Airport	Santa Cruz	160	43	1:13 pm

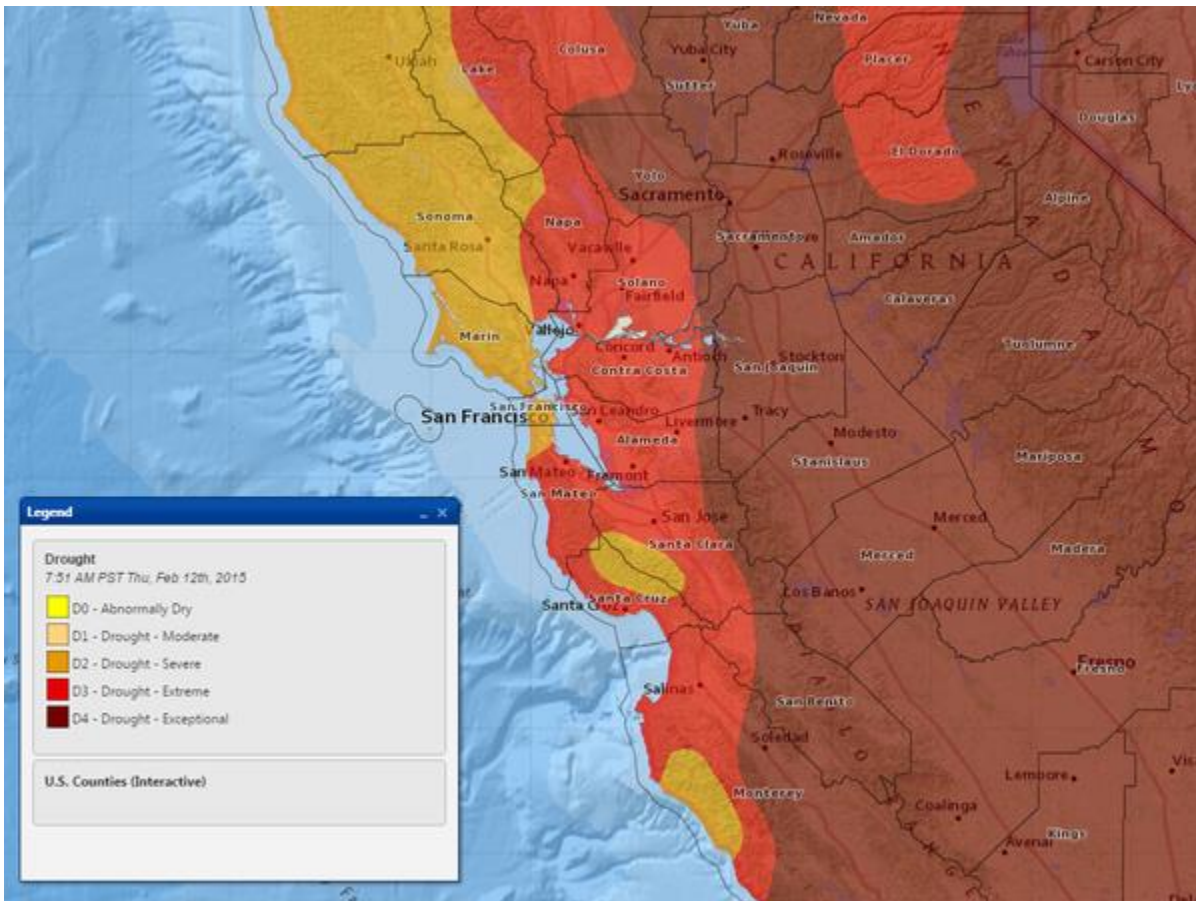
The coastal mountains picked up from 2 to 4 inches of rain on the 8<sup>th</sup>. Lower elevation locations accumulated 0.5 to 1.5 inches, except less than a half inch near southern Monterey Bay and across interior sections of Monterey and San Benito Counties. Storm total rainfall for both systems (Feb 6-8) is depicted in the graphic below. Note how orographic enhancement resulted in rain totals in the coastal mountain ranges that were more than 10 times greater as that of many lower elevation locations and more than 20 times greater than some interior valley locations.



The Thursday, February 12 update of the [Drought Monitor](#) showed the effects of the February 6-8 rain events. Improvement was noted, but primarily in the coastal ranges. The following areas were re-classified from D3 (extreme drought) to D2 (severe drought):

- Most of Sonoma County as well as northwest Napa County
- San Francisco
- Much of the Santa Cruz Mountains
- Much of the Santa Lucia Mountains





***February 12 update of the Drought Monitor, showing improved conditions across portions of the North Bay, the northern San Francisco Peninsula, the Santa Cruz Mountains, and the Santa Lucia Mountains.***

The persistent ridge that dominated California's weather during most of January redeveloped by the second week of February. By February 12 the ridge had strengthened sufficiently to produce record high temperatures across the region. Record warmth then continued for the next four days.

Some facts about the February 12-16 warm spell:

- On Friday, February 13, the high at the Salinas Airport was 85 degrees. Not only was this a record high for the date, but it was also the warmest temperature recorded during the entire month of February at this location, tying the record last set on February 20, 1995.
- On Saturday, February 14, the high temperature at the San Francisco Airport (73) was nine degrees warmer than the high temperature in Key West, Florida (64).
- On Sunday, February 15, Salinas experienced its fourth consecutive day of temperatures at or above 80 degrees F, something that had never before occurred at this climate station during the month of February.

A cool upper trough dropping in from the north on Sunday, February 22, generated no rainfall over the San Francisco Bay Area. But the system then picked up some moisture off the Pacific and managed to produce widely scattered showers over Monterey and San Benito Counties that afternoon and evening, and an isolated thunderstorm near Fort Hunter Liggett in southern Monterey County. Rainfall amounts were mostly less than a tenth of an inch, except in Parkfield in extreme southeast Monterey County where 0.43" fell.

The system that moved through on the February 22 generated gusty northerly winds across the region on the 22<sup>nd</sup> and 23<sup>rd</sup>. Widespread wind gusts of between 30 and 45 mph were observed from the evening of the 22<sup>nd</sup> through the early morning hours of the 23<sup>rd</sup>.

Another weather system dropped south along the west coast on Friday, February 27, triggering scattered showers near the southern portion of Monterey Bay that evening. Showers became more widespread by the morning of Saturday, February 28. Thunder was heard at the NWS Forecast Office in Monterey at 6 am.



***Showers developing over Monterey Bay on the morning of February 28. Photo: Ryan Smithies***

By early afternoon on February 28 a thunderstorm developed over Rohnert Park in Sonoma County, between Santa Rosa and Petaluma. This thunderstorm produced numerous lightning strikes. Isolated afternoon thunderstorms also developed over the Santa Clara Valley between southeastern San Jose and Morgan Hill, as well as the adjoining hills to the east of the valley. These storms produced small hail, enough to cover the ground in some locations.





***Hail covers the ground in the Meadowlands neighborhood in south San Jose on the afternoon of February 28. Photo: Steve Baker***

Shortly after 6 pm on the evening of February 28 a thunderstorm developed just to the south of San Francisco.



***Radar image showing a thunderstorm over extreme northern San Mateo County shortly after 6 pm on February 28***



An eyewitness reported that this storm produced a funnel cloud over northern San Mateo County. Several spectacular photographs of this storm were taken right around sunset.



***Storm clouds from Bernal Heights in San Francisco on the evening of February 28. Photo: Jacob DeFlicht***



***Lightning from Daly City on the evening of February 28. Photo: Antonio Maffei***



***Thunderstorm as seen from the Mission District of San Francisco on the evening of February 28. Photo: Marcus Muench***

Rainfall from the February 27-28 storm system was spotty and mostly light. Monterey picked up a half inch of rain and Carmel Valley accumulated 0.88". Most other locations received less than a quarter of an inch.



### **February Regional Precipitation Summary:**

Because February had only one significant precipitation event (Feb. 6-8), rainfall totals for the month were below normal across the entire region. Rain totals at the majority of climate stations were from about half to three-quarters of normal, but ranged from a low of 25 percent of normal at the Salinas Airport up to 93 percent of normal in Palo Alto.

<b>Location</b>	<b>February Rainfall</b>	<b>Normal Feb Rainfall</b>	<b>Percent of Normal</b>
<b>North Bay</b>			
Angwin	5.88	7.75	76
Calistoga	5.22	7.79	67
Kentfield	3.44	9.12	38
Muir Woods	2.58	7.06	37
Napa	2.72	5.35	51
Napa Airport	2.37	3.79	63
Occidental	5.44	9.95	55
Petaluma Airport	2.86	5.32	54
San Rafael	3.74	7.10	53
Sonoma County Airport	4.20	6.40	66
Sonoma	1.89	5.95	32
<b>San Francisco Peninsula</b>			
Palo Alto	2.96	3.20	93
San Francisco Airport	2.01	4.06	50
San Francisco Downtown	1.47	4.46	33
<b>East Bay</b>			
Antioch	1.85	2.35	79
Berkeley	2.53	5.21	49
Concord	2.99	3.70	81
Concord Airport	2.87	3.34	86
Fremont	2.27	3.17	72
Hayward Airport	2.06	3.47	59
Livermore	1.62	2.88	56
Livermore Airport	2.30	3.03	76
Martinez	2.08	3.91	53
Mount Diablo Junction	3.61	4.62	78
Newark	1.59	2.92	54
Oakland	1.88	4.50	42
Oakland Airport	2.00	3.95	51
Richmond	2.28	4.80	48
<b>South Bay &amp; Santa Cruz County</b>			
Ben Lomond	4.45	9.90	45
Gilroy	2.80	4.13	68
Los Gatos	3.40	4.87	70
Moffett Federal Airfield	2.45	3.07	80
Mount Hamilton	2.92	4.46	65
San Jose	1.74	3.11	56
Santa Cruz	2.85	6.24	46
Watsonville	2.14	4.68	46
Watsonville Airport	2.23	4.24	53

<b>Monterey and San Benito Counties</b>	<b>February Rainfall</b>	<b>Normal Feb Rainfall</b>	<b>Percent of Normal</b>
Big Sur Station	5.74	8.65	66
Carmel Valley	3.18	3.89	82
Hollister	1.83	2.74	67
King City	1.30	2.51	52
Monterey	1.39	3.92	35
Monterey Airport	1.26	3.07	41
Pinnacles National Park	1.39	3.38	41
Salinas	1.01	2.98	34
Salinas Airport	0.63	2.49	25

### **February Regional Temperature Summary**

Temperatures were warmer than normal on all but a handful off February days, and were well above normal during the record-breaking warm spells from February 2-4 and 12-16. Average temperatures for the month were well above normal at all climate stations:

<b>Location</b>	<b>Average High</b>	<b>Normal High</b>	<b>Departure from Normal</b>	<b>Average Low</b>	<b>Normal Low</b>	<b>Departure from Normal</b>
<b>North Bay</b>						
Angwin	63.7	56.2	7.5	45.3	39.8	5.5
Calistoga	69.5	62.9	6.6	44.0	39.0	5.0
Kentfield	66.9	59.9	7.0	47.5	43.2	4.3
Napa	68.7	62.2	6.5	45.2	41.9	3.3
Napa Airport	64.4	59.6	4.8	41.0	38.6	2.4
Occidental	65.5	57.7	7.8	47.1	42.8	4.3
Petaluma Airport	67.8	61.6	6.2	41.2	40.9	0.3
Saint Helena	69.5	62.0	7.5	46.0	40.8	5.2
San Rafael	66.2	58.8	7.4	48.1	43.8	4.3
Sonoma County Airport	67.2	60.5	6.7	42.6	39.1	3.5
Sonoma	67.0	61.5	5.5	42.8	39.9	2.9
<b>San Francisco Peninsula</b>						
Half Moon Bay	64.9	60.0	4.9	47.1	42.2	4.9
Palo Alto	66.6	61.6	5.0	44.9	40.6	4.3
Redwood City	67.9	61.6	6.3	46.4	42.7	3.7
San Francisco Airport	65.8	59.5	6.3	51.4	46.3	5.1
San Francisco Downtown	65.8	60.2	5.6	52.9	47.5	5.4



<b>East Bay</b>	<b>Average High</b>	<b>Normal High</b>	<b>Departure from Normal</b>	<b>Average Low</b>	<b>Normal Low</b>	<b>Departure from Normal</b>
Antioch	65.7	60.0	5.7	47.6	42.4	5.2
Berkeley	68.4	61.6	6.8	48.5	44.2	4.3
Concord	68.1	62.1	6.0	47.6	43.8	3.8
Concord Airport	67.8	61.0	6.8	45.9	42.8	3.1
Fremont	68.4	61.6	6.8	47.9	44.3	3.6
Hayward Airport	66.5	60.2	6.3	49.3	45.3	4.0
Livermore	66.5	61.0	5.5	43.9	41.5	2.4
Livermore Airport	67.9	60.4	7.5	44.6	40.4	4.2
Martinez	66.7	60.9	5.8	43.1	38.1	5.0
Mount Diablo Junction	62.7	56.6	6.1	48.4	40.3	8.1
Newark	66.9	61.1	5.8	49.1	45.2	3.9
Oakland	69.5	61.6	7.9	50.6	46.8	3.8
Oakland Airport	65.0	59.9	5.1	46.9	44.2	2.7
<b>South Bay and Santa Cruz County</b>						
Gilroy	70.7	64.3	6.4	45.4	40.9	4.5
Los Gatos	68.2	61.5	6.7	44.2	41.0	3.2
Moffett Federal Airfield	67.2	61.8	5.4	48.0	45.3	2.7
Mount Hamilton	58.1	48.1	10.0	47.6	37.5	10.1
San Jose	67.8	61.9	5.9	47.3	44.7	2.6
Santa Cruz	69.8	64.2	5.6	46.4	43.3	3.1
Watsonville	70.1	62.7	7.4	45.9	42.1	3.8
Watsonville Airport	69.3	61.4	7.9	47.5	42.3	5.2
<b>Monterey and San Benito Counties</b>						
Big Sur Station	65.8	61.5	4.3	46.6	43.1	3.5
Carmel Valley	70.9	63.5	7.4	43.3	40.8	2.5
Hollister	67.4	62.8	4.6	43.9	41.1	2.8
King City	71.6	66.0	5.6	43.0	40.2	2.8
Monterey	67.1	59.6	7.5	49.6	44.7	4.9
Monterey Airport	67.0	60.7	6.3	47.7	44.7	3.0
Pinnacles National Park	70.8	63.0	7.8	38.2	35.6	2.6
Salinas	70.3	63.9	6.4	46.4	41.5	4.9
Salinas Airport	71.0	62.8	8.2	48.5	43.2	5.3

February 2015 was the ***warmest February on record*** at most climate stations across the region, including Downtown San Francisco where temperature records go back to 1875.

Warmest February on Record				
Location	Normal Feb Average Temp	February 2015 Average Temp	Previous Warmest Feb and Year	Length of Climate Record (yrs)
Angwin	48.0	54.5	53.8 in 1988	64
Antioch	51.2	56.7	56.1 in 1963	61
Berkeley	52.9	58.5	57.3 in 1963	117
Gilroy	52.6	58.1	57.0 in 1991	59
Half Moon Bay	51.1	56.0	55.3 in 1980	75
Kentfield	51.6	57.2	56.2 in 1963	111
Livermore	51.3	55.2	55.0 in 1907	113
Los Gatos	51.3	56.2	55.7 in 1963	122
Monterey	52.2	58.4	57.5 in 1963	69
Mount Diablo Junction	48.5	55.6	54.8 in 1977	64
Mount Hamilton	42.8	52.9	51.6 in 1995	68
Napa	52.1	57.0	56.8 in 1963	117
Newark	53.2	58.0	56.7 in 1963	73
Oakland Museum	54.2	60.1	58.0 in 1992	45
Richmond	53.2	60.1	57.7 in 1963	66
Salinas	52.7	58.4	57.6 in 1995	57
Salinas Airport	53.0	59.8	57.6 in 1963	83
San Francisco Airport	52.9	58.6	56.3 in 1986	71
San Francisco Downtown	53.9	59.4	58.9 in 1986	141
Santa Cruz	53.8	58.1	56.4 in 1930	123
Watsonville	52.4	58.0	56.4 in 1963	102

Four other climate stations experienced their second warmest February on record:

Second Warmest February on Record				
Location	Normal Feb Average Temp	February 2015 Average Temp	Warmest Feb and Year	Length of Climate Record (yrs)
King City	53.1	57.3	58.2 in 1963	83
Martinez	49.5	54.9	55.6 in 1963	74
San Jose	53.3	57.6	59.0 in 1963	116
San Rafael	51.3	57.2	58.5 in 1963	66



The winter months of December, January and February were all much warmer than normal, making the 2014-15 winter season the warmest winter on record throughout the region.

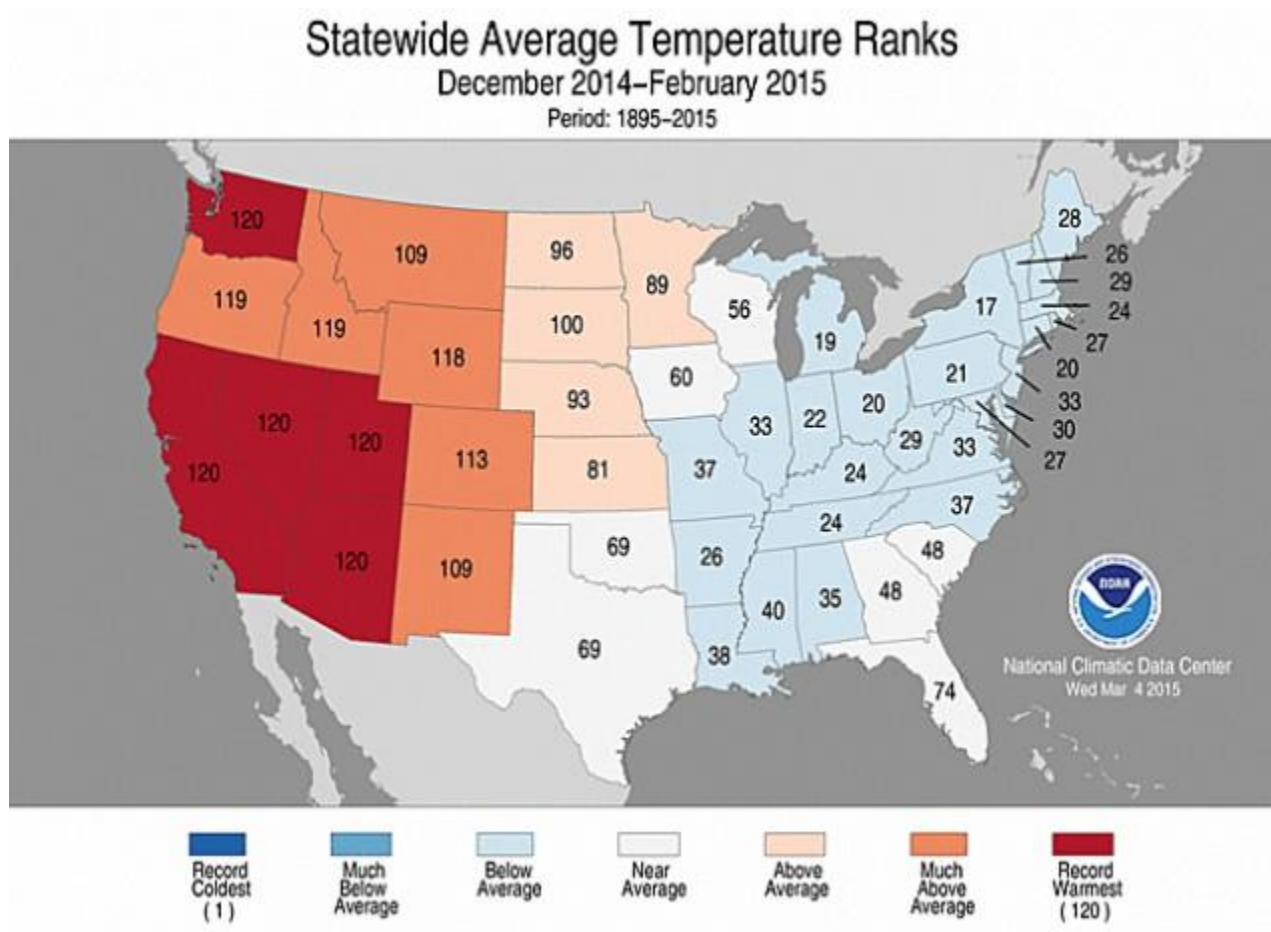
Warmest Winter* on Record			
Location	Winter 2014-15 Average Temp	Previous Warmest Winter Avg. Temp	Length of Climate Record (yrs)
Berkeley	55.7	54.9 in 1970	117
Half Moon Bay	55.4	53.9 in 1981	75
Kentfield	54.0	53.0 in 1996	111
King City	54.6	53.5 in 1980	83
Livermore	52.5	51.7 in 1918	113
Monterey	56.6	55.1 in 1981	69
Mount Hamilton	49.4	49.1 in 2014	68
Napa	54.0	52.6 in 1970	117
Oakland Museum	57.7	54.8 in 2003	45
Salinas Airport	57.8	55.1 in 1981	83
San Francisco Airport	56.4	54.0 in 1959	71
San Francisco Downtown	56.9	55.6 in 1970	141
San Rafael	55.5	54.8 in 1970	66
Santa Cruz	55.7	54.3 in 1941	123
Watsonville	56.2	54.5 in 1918	102

\*Meteorological winter is defined as the months of December, January and February.

In addition, Mount Diablo Junction and San Jose both came very close to experiencing their warmest winter.

Second Warmest Winter on Record			
Location	Winter 2014-15 Average Temp	Warmest Winter Average Temp	Length of Climate Record (yrs)
Mount Diablo Junction	53.0	53.1 in 1977	64
San Jose	54.3	54.4 in 1996	116

Not only was the 2014-15 winter season the warmest winter on record across the San Francisco Bay Region and North-Central Coast, but it was also the warmest winter for the state of California and for much of the western United States.



***The 2014-15 winter season was the warmest on record in five western states (California, Arizona, Nevada, Utah and Washington). The entire western CONUS was much warmer than average while the eastern half of the country was generally cooler than average.***

### Miscellaneous December Climate Information:

Daily High Temperature Records for February 2015			
Date	Location	Record Max Temp	Previous Record and Year
2/2	Oakland Museum	72	71 in 1982
2/3	Moffett Federal Airfield	71	70 in 2009
2/3	Salinas	78	78 in 1995
2/4	King City	81	80 in 2001
2/12	Oakland Museum	79	70 in 2006
2/12	Oakland Airport	69	69 in 1953
2/12	Moffett Federal Airfield	73	73 in 1988
2/12	Salinas Airport	82	82 in 1971
2/13	Moffett Federal Airfield	75	73 in 1991
2/13	San Jose	77	76 in 1943
2/13	Salinas	84	79 in 2006
2/13	Salinas Airport	85	78 in 1996
2/14	Santa Cruz	82	81 in 1943
2/14	Salinas	83	82 in 1985
2/14	Salinas Airport	84	82 in 1943
2/15	San Francisco Airport	73	72 in 1977
2/15	Oakland Museum	80	78 in 1977
2/15	Salinas Airport	81	80 in 2013
2/16	Oakland Museum	75	73 in 2007
2/16	Richmond	75	73 in 2013

Daily Low Temperature Records for February 2015			
Date	Location	Record Min Temp	Previous Record and Year
2/24	Oakland Airport	36	36 in 1960

Monthly Ranks for Downtown San Francisco		
Average High Temperature	65.8 deg	3 <sup>rd</sup> warmest February out of 141 years
Average Low Temperature	52.9 deg	2 <sup>nd</sup> warmest February out of 141 years
Average Mean Temperature	59.4 deg	<b>Warmest Feburary</b> out of 141 years (previous record: 58.9 in 1986)
Precipitation	1.47 in	38th driest February out of 166 years



Monthly Extremes for Select Locations			
Location	Max Temp: Warmest Day(s)	Min Temp: Coolest Day(s)	Precipitation: Wettest Day(s)
Sonoma County Airport	2/14	2/24	2/06
	77 degrees	30 degrees	2.62 inches
San Francisco	2/15	2/24	2/08
	75 degrees	48 degrees	0.73 inches
Livermore Airport	2/15	2/24	2/06
	77 degrees	33 degrees	0.96 inches
San Jose	2/13	2/24	2/06
	77 degrees	35 degrees	1.26 inches
Salinas Airport	2/13	2/24	2/06 2/07
	85 degrees*	37 degrees	0.20 inches

\* 85 degrees at the Salinas Airport on 2/13 was a record high for the entire month of February.

Information on "climate normals": <http://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/climate-normals/1981-2010-normals-data>

**Note: Climatological data included in this document is preliminary.**

**For official certified climatological data please contact the National Climatic Data Center at 828-271-4800 or**

**<http://www.ncdc.noaa.gov>.**

**Official values as determined at the above web site may take several months for authentication and publication.**